

IN THE CLAIMS

Please amend claims 60, 70-71, 94, 95, 105, and 109-110 as follows below.

Please add new claims 113-116 as follows below.

Please accept the following marked up version of the entire set of pending claims as amended by this response.

1 1-59. (Cancelled)

1 60. (Currently Amended) A fiber optic module comprising:

2 a first optoelectronic device to couple photons into or

3 receive photons out of a first optical fiber;

4 a first printed circuit board coupled to the first

5 optoelectronic device parallel to an optical axis of the first

6 optoelectronic device, the first printed circuit board having

7 one or more pins;

8 a shielded housing spaced around the first printed circuit

9 board, the shielded housing to reduce electromagnetic

10 interference (EMI); and

11 a base coupled to the shielded housing, the base extending

12 along a length of and perpendicular to the first printed circuit

13 board, the base having an opening for the one or more pins of

14 the first printed circuit board to extend through.

1 61. (Previously Presented) The fiber optic module of claim

2 60 wherein,

3 the first optoelectronic device has a first terminal
4 electrically coupled to one side of the first printed circuit
5 board and a second terminal electrically coupled to an opposite
6 side of the first printed circuit board.

1 62. (Previously Presented) The fiber optic module of claim
2 60 wherein,

C 3 the first printed circuit board is a vertical printed
4 circuit board perpendicular to a horizontal plane and the
5 optical axis of the first optoelectronic device is parallel to
6 the horizontal plane.

1 63. (Previously Presented) The fiber optic module of claim
2 60 wherein,

3 the fiber optic module mounts to a system printed circuit
4 board such that the first printed circuit board is perpendicular
5 to the system printed circuit board and the optical axis of the
6 first optoelectronic device is parallel to the system printed
7 circuit board.

1 64. (Previously Presented) The fiber optic module of claim
2 63 wherein,

3 the one or more pins of the first printed circuit board

4 couple to the system printed circuit board.

1 65. (Previously Presented) The fiber optic module of claim
2 63 wherein,

3 the one or more pins of the first printed circuit board
4 couple to a connector of the system printed circuit board.

1 66. (Previously Presented) The fiber optic module of claim
2 60 further comprising:

3 a first lens to focus photons between the first
4 optoelectronic device and the optical fiber.

1 67. (Previously Presented) The fiber optic module of claim
2 60 wherein:

3 the shielded housing is electrically coupled to ground.

1 68. (Previously Presented) The fiber optic module of claim
2 67 wherein:

3 the shielded housing electrically couples to ground by
4 coupling to a system chassis.

1 69. (Previously Presented) The fiber optic module of claim
2 67 wherein:

3 the shielded housing electrically couples to ground through

4 a trace on the first printed circuit board which is coupled to
5 one of the one or more pins of the first printed circuit board.

1 70. (Currently Amended) The fiber optic module of claim 60
2 wherein,

3 the shielded housing includes the base as a portion
4 thereof, ~~the base having one or more openings from which the one~~
5 ~~or more pins of the first printed board extend.~~

C 1 71. (Currently Amended) The fiber optic module of claim 60
2 wherein,

3 the base has a plurality of ~~one or more~~ openings from which
4 the ~~one or more~~ pins of the first printed board extend.

1 72. (Previously Presented) The fiber optic module of claim
2 60 further comprising:

3 a nose to receive an optical fiber connector and hold an
4 optical fiber substantially fixed and aligned with the optical
5 axis of the first optoelectronic device.

1 73. (Previously Presented) The fiber optic module of claim
2 72 wherein,

3 the nose provides shielding to reduce electromagnetic
4 interference (EMI).

1 74. (Previously Presented) The fiber optic module of claim
2 60 further comprising:

3 a second optoelectronic device to receive photons out of or
4 couple photons into a second optical fiber;

5 a second printed circuit board parallel to the first
6 printed circuit board, the second printed circuit board coupled
7 to the second optoelectronic device parallel to an optical axis
8 of the second optoelectronic device, the second printed circuit
9 board having a second plurality of pins; and wherein,

10 the shielded housing is spaced around the first and second
11 printed circuit boards to reduce electromagnetic interference
12 (EMI).

1 75. (Previously Presented) The fiber optic module of claim
2 74 wherein,

3 the second optoelectronic device has a first terminal
4 coupled to one side of the second printed circuit board and a
5 second terminal coupled to an opposite side of the second
6 printed circuit board.

1 76. (Previously Presented) The fiber optic module of claim
2 74 wherein,

3 the shielded housing includes the base as a portion

4 thereof, the base having openings from which the one or more
5 pins of the first printed board extend and the one or more pins
6 of second printed circuit board extend.

1 77. (Previously Presented) The fiber optic module of claim
2 74 wherein,

3 the base has openings from which the one or more pins of
4 the first printed board extend and the one or more pins of
5 second printed circuit board extend.

1 78. (Previously Presented) The fiber optic module of claim
2 74 further comprising:

3 a nose to receive a first optical fiber connector and hold
4 a first optical fiber substantially fixed and aligned with the
5 optical axis of the first optoelectronic device and to receive a
6 second optical fiber connector and hold a second optical fiber
7 substantially fixed and aligned with the optical axis of the
8 second optoelectronic device.

1 79. (Previously Presented) The fiber optic module of claim
2 78 wherein,

3 the nose provides shielding to reduce electromagnetic
4 interference (EMI).

1 80. (Previously Presented) The fiber optic module of claim
2 74 wherein,
3 the first printed circuit board and the second printed
4 circuit board are vertical printed circuit boards perpendicular
5 to a horizontal plane.

1 81. (Previously Presented) The fiber optic module of claim
2 74 wherein,
3 the first printed circuit board and the second printed
4 circuit board are vertical printed circuit boards perpendicular
5 to a system printed circuit board when the fiber optic module is
6 mounted thereto.

1 82. (Previously Presented) The fiber optic module of claim
2 74 further comprising:
3 an internal shield between the first printed circuit board
4 and the second printed circuit board and parallel therewith
5 and wherein, the shielded housing is spaced around the
6 first printed circuit board and the second printed circuit board
7 to reduce electromagnetic interference (EMI).

1 83. (Previously Presented) A fiber optic module for
2 coupling photons between optoelectronic devices and optical

3 fibers, the fiber optic module comprising:

4 a base to mount the fiber optic transceiver in a system to
5 couple photons between optoelectronic devices and optical
6 fibers;

7 a first printed circuit board perpendicular to the base,
8 the first printed circuit board having a pin inserted through a
9 first opening in the base;

10 a first optoelectronic device having terminals coupled to
11 the first printed circuit board, the first optoelectronic device
12 having an optical axis parallel to the first printed circuit
13 board;

14 a second printed circuit board perpendicular to the base
15 and parallel to the first printed circuit board, the second
16 printed circuit board having a pin inserted through a second
17 opening in the base;

18 a second optoelectronic device having terminals coupled to
19 the second printed circuit board, the second optoelectronic
20 device having an optical axis parallel to the second printed
21 circuit board; and

22 a shielded housing coupled to the base, the shielded
23 housing spaced apart and wrapped around the first printed
24 circuit board and the second printed circuit board to reduce
25 electromagnetic interference (EMI).

1 84. (Previously Presented) The fiber optic module of claim
2 83 further comprising:
3 an internal shield between the first printed circuit board
4 and the second printed circuit board and parallel therewith
5 and wherein, the shielded housing is spaced apart and
6 wrapped around the first printed circuit board and the second
7 printed circuit board to reduce electromagnetic interference
8 (EMI).

C 1 85. (Previously Presented) The fiber optic module of claim
2 84 wherein,
3 the internal shield provides shielding to reduce crosstalk
4 between the first printed circuit board and the second printed
5 circuit board.

1 86. (Previously Presented) The fiber optic module of claim
2 83 further comprising:
3 a first lens to focus photons between the first
4 optoelectronic device and a first optical fiber; and
5 a second lens to focus photons between the second
6 optoelectronic device and a second optical fiber.

1 87. (Previously Presented) The fiber optic module of claim

2 83 wherein,

3 the first printed circuit board and the second printed
4 circuit board are vertical printed circuit boards perpendicular
5 to a horizontal plane.

1 88. (Previously Presented) The fiber optic module of claim

2 83 wherein,

3 the first printed circuit board and the second printed
4 circuit board are vertical printed circuit boards perpendicular
5 to a horizontal system printed circuit board when the fiber
6 optic module is mounted thereto.

1 89. (Previously Presented) The fiber optic module of claim

2 83 further comprising:

3 a nose coupled to the base, the nose to receive an optical
4 fiber connector to align a pair of optical fibers with the
5 optical axis of the first optoelectronic device and the optical
6 axis of the second optoelectronic device.

1 90. (Previously Presented) The fiber optic module of claim

2 89, wherein,

3 the nose includes shielding to reduce electromagnetic
4 interference.

1 91. (Previously Presented) The fiber optic module of claim
2 83, wherein,
3 the fiber optic module is a fiber optic transceiver and
4 wherein
5 the first optoelectronic device is a photodetector,
6 and
7 the second optoelectronic device is an emitter.

C¹ 1 92. (Previously Presented) The fiber optic module of claim
2 91, wherein,
3 the emitter is a vertical cavity surface emitting laser
4 (VCSEL).

1 93. (Previously Presented) The fiber optic module of claim
2 83 wherein,
3 the first optoelectronic device has a first terminal
4 electrically coupled to one side of the first printed circuit
5 board and a second terminal electrically coupled to an opposite
6 side of the first printed circuit board, and
7 the second optoelectronic device has a first terminal
8 electrically coupled to one side of the second printed circuit
9 board and a second terminal electrically coupled to an opposite
10 side of the second printed circuit board.

1 94. (Currently Amended) A method of assembling a fiber
2 optic module, the method comprising:
3 providing a first printed circuit board; [[and]]
4 coupling terminals of a first optoelectronic device to the
5 first printed circuit board such that an optical axis of the
6 first optoelectronic device is parallel with the first printed
7 circuit board;
8 providing a second printed circuit board spaced apart from
9 the first printed circuit board; [[and]]
10 coupling terminals of a second optoelectronic device to the
11 second printed circuit board such that an optical axis of the
12 second optoelectronic device is parallel with the second printed
13 circuit board; [[and]]
14 providing a shielded housing spaced around the first
15 printed circuit board and the second printed circuit board such
16 that the first printed circuit board is parallel with the second
17 printed circuit board and the optical axis of the first
18 optoelectronic device is parallel with the optical axis of the
19 second optoelectronic device; and
20 coupling a base to the shielded housing, the base extending
21 along lengths of the first printed circuit board and the second
22 printed circuit board and being perpendicular thereto.

1 95. (Currently Amended) The method of claim 94 further
2 ~~comprising~~, wherein
3 the coupling of the [[a]] base to the shielded housing
4 perpendicular to the first printed circuit board and the second
5 printed circuit board includes

6 aligning one or more first openings in the base
7 with one or more pins of the first printed circuit
8 board and one or more second openings in the base with
9 one or more pins of the second printed circuit board,
10 and

11 coupling the base to the shielded housing such
12 that the one or more pins of the first printed circuit
13 board and the one or more pins of the second printed
14 circuit board are respectively within the one or more
15 first openings and the one or more second openings in
16 the base.

1 96. (Previously Presented) The method of claim 94 further
2 comprising:

3 prior to providing the shielded housing spaced around the
4 first printed circuit board and the second printed circuit
5 board,

6 inserting an internal shield between the first printed

7 circuit board and the second printed circuit board.

1 97. (Previously Presented) The method of claim 94 wherein,
2 the first printed circuit board and the second printed
3 circuit board are vertical printed circuit boards perpendicular
4 to a horizontal plane.

1 98. (Previously Presented) The method of claim 94 wherein,
2 the first printed circuit board and the second printed
3 circuit board are vertical printed circuit boards perpendicular
4 to a horizontal system printed circuit board when the fiber
5 optic module is mounted thereto.

1 99. (Previously Presented) The method of claim 94 wherein,
2 the first optoelectronic device has a first terminal
3 electrically coupled to one side of the first printed circuit
4 board and a second terminal electrically coupled to an opposite
5 side of the first printed circuit board, and

6 the second optoelectronic device has a first terminal
7 electrically coupled to one side of the second printed circuit
8 board and a second terminal electrically coupled to an opposite
9 side of the second printed circuit board.

1 100. (Previously Presented) The fiber optic module of claim

2 60 wherein,

3 the shielded housing is a metal housing.

1 101. (Previously Presented) The fiber optic module of claim

2 60 wherein,

3 the shielded housing is a metal plated plastic housing.

1 102. (Previously Presented) The fiber optic module of claim

2 74 wherein,

3 the first optoelectronic device is a photodetector to

4 receive photons out of the first optical fiber,

5 the second optoelectronic device is an emitter to couple

6 photons into the second optical fiber, and

7 the fiber optic module is a fiber optic transceiver module.

1 103. (Previously Presented) The fiber optic module of claim

2 83 wherein,

3 the shielded housing is a metal housing.

1 104. (Previously Presented) The fiber optic module of claim

2 83 wherein,

3 the shielded housing is a metal plated plastic housing.

1 105. (Currently Amended) A fiber optic module comprising:

2 a first optoelectronic device to couple photons into or
3 receive photons out of a first optical fiber;

4 a first printed circuit board coupled to the first
5 optoelectronic device parallel to an optical axis of the first
6 optoelectronic device, the first printed circuit board having
7 one or more pins; and

8 a metallic shielded housing spaced apart around the first
9 printed circuit board, the metallic shielded housing to reduce
10 electromagnetic interference (EMI), the metallic shielded
11 housing has a base as a portion thereof, the base extending
12 perpendicularly along a length of the first printed circuit
13 board and having one or more openings from which the one or more
14 pins of the first printed board extend.

1 106. (Previously Presented) The fiber optic module of claim
2 105 wherein:

3 the metallic shielded housing is electrically coupled to
4 ground.

1 107. (Previously Presented) The fiber optic module of claim
2 106 wherein:

3 the metallic shielded housing electrically couples to
4 ground by coupling to a system chassis.

1 108. (Previously Presented) The fiber optic module of claim
2 106 wherein:

3 the metallic shielded housing electrically couples to
4 ground through a trace on the first printed circuit board which
5 is coupled to one of the one or more pins of the first printed
6 circuit board.

1 109. (Currently Amended) The fiber optic module of claim 105
2 wherein,

3 the metallic shielded housing is a metal plated plastic has
4 ~~a base as a portion thereof, the base having one or more~~
5 ~~openings from which the one or more pins of the first printed~~
6 ~~board extend.~~

1 110. (Currently Amended) A ~~[[The]]~~ fiber optic module of
2 ~~claim 105 further comprising:~~

3 a first optoelectronic device to couple photons into or
4 receive photons out of a first optical fiber;

5 a first printed circuit board coupled to the first
6 optoelectronic device parallel to an optical axis of the first
7 optoelectronic device, the first printed circuit board having
8 one or more pins; and

9 a metallic shielded housing spaced apart around the first

10 printed circuit board, the metallic shielded housing to reduce
 11 electromagnetic interference (EMI),
 12 a base coupled to the metallic shielded housing
 13 perpendicular to the first printed circuit board, the base
 14 having one or more openings from which the one or more pins of
 15 the first printed board may extend.

1 111. (Previously Presented) The fiber optic module of claim
 2 105 further comprising:

3 a second optoelectronic device to receive photons out of or
 4 couple photons into a second optical fiber;

5 a second printed circuit board parallel to the first
 6 printed circuit board, the second printed circuit board coupled
 7 to the second optoelectronic device parallel to an optical axis
 8 of the second optoelectronic device, the second printed circuit
 9 board having a second plurality of pins; and wherein,

10 the metallic shielded housing is spaced apart around the
 11 first and second printed circuit boards to reduce
 12 electromagnetic interference' (EMI).

1 112. (Previously Presented) The fiber optic module of claim
 2 111 wherein,

3 the first optoelectronic device is a photodetector to
 4 receive photons out of the first optical fiber,

5 the second optoelectronic device is an emitter to couple
6 photons into the second optical fiber, and
7 the fiber optic module is a fiber optic transceiver module.

1 113. (New) The fiber optic module of claim 110 further
2 comprising:

3 a second optoelectronic device to receive photons out of or
4 couple photons into a second optical fiber;

5 a second printed circuit board parallel to the first
6 printed circuit board, the second printed circuit board coupled
7 to the second optoelectronic device parallel to an optical axis
8 of the second optoelectronic device, the second printed circuit
9 board having a second plurality of pins; and wherein,

10 the metallic shielded housing is spaced apart around the
11 first and second printed circuit boards to reduce
12 electromagnetic interference (EMI).

1 114. (New) The fiber optic module of claim 113 wherein,
2 the first optoelectronic device is a photodetector to
3 receive photons out of the first optical fiber,

4 the second optoelectronic device is an emitter to couple
5 photons into the second optical fiber, and

6 the fiber optic module is a fiber optic transceiver module.

1 115. (New) The fiber optic module of claim 110 further
2 comprising:
3 a nose coupled to the base, the nose having an opening to
4 receive an optical fiber connector to align an optical fiber
5 with the optical axis of the first optoelectronic device.

1 116. (New) The fiber optic module of claim 115 further
2 comprising:
3 nose shielding coupled over the nose to reduce
4 electromagnetic interference.
